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SLIP SLIDING AWAY: FURTHER UNION DECLINE IN GERMANY AND BRITAIN

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ABSTRACT

This paper presents the first comparative analysis of the decline in collective bargaining in two European countries where that decline has been among the most pronounced. Using establishment-level data and a common model, we present decompositions of changes in collective bargaining in the private sector in Germany and Britain over the period 1998-2004. In both countries, within-effects dominate compositional changes as the source of the recent decline in unionism. Overall, the decline in collective bargaining is more pronounced in Britain than in Germany, thus continuing a trend apparent since the 1980s. Although establishment characteristics differ markedly across the two countries, assuming counterfactual values of these characteristics makes little difference to unionization levels. Expressed differently, the German dummy looms large.

I INTRODUCTION

Recent years have witnessed a decline in unionism in Western Europe (Blanchflower, 2007; Ebbinghaus and Visser, 1999; Visser, 2003, 2006). The decline has not been uniform but has instead been concentrated in the larger countries, particularly Britain, Germany, and Italy. We take advantage of unique comparable establishment data to examine developments in two of these countries, Germany and Britain.

We contribute to the existing literature which has focused almost entirely on union density using household data, by exploring factors behind the demise of private sector unionization at establishment level.[1] We deploy a common model of the determinants of collective bargaining and undertake a shift-share analysis of observed changes in the outcome indicators both across time and vertically (i.e. at a single point in time).

The goal is to determine the contribution of compositional factors on the one hand and behavioural or within-group factors on the other to the decline in unionization. Although similar such decompositions based on union density have been undertaken for individual countries, ours is the first such comparative exercise. And apart from one other (single-country) study it is the first to consider union recognition rates at establishment level rather than on aggregations based on the union status of individuals. Moreover, unlike that study it covers a larger slice of the labour force, namely establishments with 10 or more employees rather than 25 or more employees.

II BACKGROUND

The decline in unionism in Britain long preceded our sample period. Writing at the beginning of this decade, and reflecting on the findings of a study tracking employment relations over the previous two decades, Millward *et al.* (2000, p. 234) commented: "The system of collective relations, based on the shared values of the legitimacy of representation by independent trade unions and of joint regulation, crumbled … to such an extent that it no longer represents a dominant model." Between 1979 and 1999 the percentage of employees who were union members fell from 73 percent to 28 percent; in 1980 about 70 percent of establishments recognized unions for collective bargaining purposes, declining to less than 45 percent by the mid-1990s (Machin, 2000). These results were driven by developments in the private sector, and above all in manufacturing.

Commentators were now to refer to unions as "hollow shells" (Hyman, 1997; Brown *et al*., 1998; Millward *et al*., 2000), their parlous state severely affecting their ability to service current members' interests, let alone organize parts of the non-union sector (Willman and Bryson, 2009). The tendency was for new establishments and new entrants to the labour force to be 'born' non-union (Machin, 2000; Willman *et al*., 2007), resulting in a rise in the proportion of all employees in the labour force who had never been union members (Bryson and Gomez, 2005).

In Britain, there is no legal impediment to a plant engaging in both sectoral and firm or establishment bargaining. In practice, by the start of our sample period, sectoral bargaining was already a spent force outside of the public sector (Brown *et al*., 2009, p. 34). The demise of national pay bargaining in Britain reflects a decision made by employers to move away from a scenario in which sectoral bargaining set a floor to pay,

effectively taking wages out of competition, to a situation in which employers are actively competing on the basis of labour costs.

Unlike Britain, in Germany firm-level and sectoral-level bargaining are mutually exclusive: they cannot co-exist at establishment level. Firm level bargaining may be used by larger firms able to absorb the fixed costs of a dedicated system. Nevertheless, the majority of large firms simply subscribe to the sectoral bargaining system. Smaller firms may use sectoral bargaining to benchmark their pay to the standard set by (most) others (Schmidt and Dworschak, 2006). Necessarily, this rationale breaks down if sectoral pay is set by large firm 'leaders' – a form of pattern bargaining – setting wages which only they can afford. This may precipitate exit from sectoral agreements to 'no agreement' by smaller and less well placed firms.

Historically, sectoral bargaining (strictly, regional industry-wide bargaining) has been the key form of collective bargaining in Germany, covering some 90 percent of all employees. As Schnabel *et al*. (2006, p. 168) note, things first began to change in the early 1970s with the emergence of what they term "qualitative bargaining policy," namely sectoral agreements that sought to accommodate improvements in working life and the protection of employees against dislocations caused by rationalization and technical change. Such provisions were to be implemented at local level. Thence, in the 1990s, under the pressures of globalization, high unemployment, and unification, the system of collective bargaining began to erode. The manifestations of this erosion included a rising trend of firm resignations from employers' associations (Silvia and Schroeder, 2007), a rapid decline in union density (Addison *et al.*, 2007), and shrinking collective bargaining coverage (Kohaut and Schnabel, 2003). Moreover, the coverage of

that other pillar of the German dual system – the works council – was also subject to some erosion (Hassel, 1999). In response to these challenges, German collective bargaining was decentralizing. One aspect of this development was the growth in company agreements as many firms dropped out of the centralized system. Another was the growth of decentralization in sectoral agreements – first through the device of 'opening clauses' that allowed firms more flexibility via locally negotiated adjustments to centrally agreed working time and wages, and latterly through other contractual innovations including 'pacts for employment and competitiveness' (Addison *et al*., 2009). Such organized decentralization may have slowed the flight from sectoral collective bargaining to firm-level bargaining and individual bargaining. Nevertheless, from 1990 to 1997 the number of company agreements rose from 2,100 to 3,300 in western Germany (and from 2,700 to 5,000 in the whole of Germany) while the percentage of employees in western Germany who were covered by collective (sectoral) agreements fell from 83.1 (72.2) percent in 1995 to 75 (67.8) percent in 1998 (Hassel, 1999).

The decline in union density has been fairly extensively charted in Britain, somewhat less so in Germany given the longer-standing decline in the former nation. One early hallmark of the British analysis was the attempt to decompose the decline in unionization into its constituent parts. For the decade of the 1980s (strictly 1983-1989) Green (1992) concludes that the combined effect of compositional factors to the observed decline in private-sector union density from 49.6 to 38.6 percent was 30 percent, which is taken by the author to be an upper-bound estimate since compositional changes are not independent of public policy or macroeconomic conditions.

In investigating the 16 percentage point fall in private-sector union density over the period 1983-2001, Bryson and Gomez (2005) find that just one percentage point is explained by an increase in the number of workers who ceased being union members. The remainder is due to the rise in the percentage of employees who never join a trade union ("never-members").[2] Overall, the authors conclude that 60 percent of the 20 percentage point increase in never-membership over the period was due to compositional factors.

We are only aware of one British study that uses plant level data to identify the contribution of compositional change of unionization rates. (The others investigate union density based on the union status of individuals.) Blanchflower and Bryson (2009) show that the share of establishments recognizing one or more unions for collective bargaining (viz. the union recognition rate) fell from 49.5 percent in 1980 to 22.3 percent in 2004 among all private-sector establishments with 25 or more employee. Applying the predictions of the 1980 model to the 2004 sample, they conclude that behavioral factors (largely employer choices) dominated any effects arising from changes in the structure of the establishment since no less than 68 percent (18.5 percentage points) of the decline in union recognition was the result of within-group changes.

The early literature on the determinants of union density in Germany indicated that the propensity for union membership had not changed materially over time (see, inter al., the literature review in Fitzenberger *et al.,* 2006). However, two more recent contributions challenge the implication that the decline in union density in that country has mainly been driven by composition effects. Using data from three cross sections of the ALLBUS general survey from 1980 to 2004 in western Germany and from 1992 to 2004 in eastern Germany, Schnabel and Wagner (2007) find changes in the composition

of the sample of employees in western Germany explain just 0.16 percentage points (or 1.4 percent) of the 11.49 percentage point decline in the share of employees that were union members over the sample period (although the compositional effects are larger when taking the results for 2004 as the reference group). The east German results pointed to even smaller compositional effects.

A study by Fitzenberger, Kohn, and Wang (2006) using data from six (four) waves of the German Socio-Economic Panel for western (eastern) Germany estimates individual membership functions via a correlated random effects probit model. The characteristics' effects explain under one-third of the 6 percentage point decline in union density in western Germany between 1993 and 2003, and under one-fifth of the 19 percentage point decline in eastern Germany over the same interval. The role of characteristics versus coefficients is also evaluated in terms of east-west comparisons at the start and end of the period. In 1993 when union density in the east exceeded that in the west by 11 percentage points, the composition of the west German labor force actually favored higher density (by 5 percentage points). Accordingly, the higher density in the east resulted from a 16 percentage point difference in coefficients; that is, for given characteristics, east Germans were at this time more strongly unionized than their western counterparts. But by 2003 union density in the east had fallen some 2 percentage points below that of the west. Since the composition of the labour force in the west still favored higher density, it follows that the coefficients effect had become more similar in the two halves of the country. On balance, therefore, the emerging consensus of the recent German literature is that changes in the composition of the workforce have played a minor role in the decline in *union density*.

In what follows, we analyze the decline in private-sector collective bargaining in Britain and Germany. Our unit of analysis throughout is the establishment. Drawing on the German Institute for Employment Research Establishment (IAB) Panel and the British Workplace Employment Relations Surveys (WERS), we offer the first unified comparative analysis of the erosion of collective bargaining coverage to complement the recent disparate studies of union density in each country.

III DATA

The German data are taken from the private sector establishments in the IAB Establishment Panel. The Panel is based on a stratified random sample of establishments[3] – the strata are currently defined over 17 industries and 10 employment size categories – from the population of all establishments with at least one employee covered by social insurance (see Fischer *et al*., 2009). The basis for sampling is the Federal Employment Agency establishment file, containing some 2 million establishments. The panel was set up in 1993 for western Germany so as to provide a representative information system permitting continuous analysis of labour demand. It was applied to eastern Germany in 1996 and is therefore now nationwide in its coverage. From the outset the IAB Establishment panel was intended as a longitudinal survey, so that a large majority of the same plants are interviewed each year. To correct for panel mortality, exits, and newly founded firms, however, the data are augmented regularly. Taken in conjunction with other extension samples (to allow regional analysis at the federal state level), the panel has grown over time and now the number of plants surveyed is around 16,000 units.

The survey is generally carried out in the form of face-to-face interviews, with written postal surveys also being undertaken in some federal states. The overall response rate to the surveys has varied between 63 percent and 73 percent. It is lower for first-time respondents and for the written surveys. But the response rate for the orally-interviewed continuing establishments is stable at between 81 percent and 84 percent. (On the cross-sectional and longitudinal weighting procedures, see Fischer *et al*., 2009.)

We restrict the German data to the 1998 and 2004 cross-sections of the IAB Establishment Panel to maintain correspondence with the two British establishment surveys. The German raw sample contains a total of some 25,451 observations: 9,762 from the 1998 survey and 15,689 observations from the 2004 survey.

The British data are taken from the 1998 and 2004 WERS. These are cross-sectional surveys based on stratified random samples of establishments taken from the Inter-Departmental Business Register which contains the population of establishments in Britain that are subject to VAT or maintain tax records for the purpose of paying employees. The survey covers all sectors of the British economy with the exception of mining and quarrying; agriculture, hunting, and forestry; fishing; private households with employed persons; and extraterritorial bodies. However, for the purposes of the present exercise, we confine our attention to private-sector establishments. The unit of analysis is the establishment, namely a place of employment at a single address or site. For the 1998 WERS the population was all establishments with at least 10 employees. For the 2004 WERS, however, the employment threshold was lowered to 5 employees. We retain the 10 employee threshold to ensure comparability across the two British surveys. (Filters were applied to the German data to provide a comparable sample, including the public

sector and size restrictions.) The final estimation sample for Britain is 2,991, comprising 1,502 establishments in 1998 and 1,489 in 2004. This number falls to 2,920 when distinguishing bargaining levels due to some missing observations.

All independent variables are collected in face-to-face interviews with the senior manager responsible for employment relations on a day-to-day basis. The response rate was 80 percent in 1998 and 65 percent in 2004. As in the German case, we apply sample weights so that our analyses are nationally representative of private-sector establishments in Britain with 10 or more employees (For full details of the two surveys, see Chaplin *et al*., 2005; Airey *et al*., 1999.)

Most of the variables used in our analysis are self-explanatory, but two of them deserve some additional explanation. First, the definition of a 'leading region' in Britain is London and the South East of England, whereas for Germany it is simply western Germany. Second, the 'proportion of skilled workers' in Britain is based on the proportion of employees in the establishment in skilled occupations, defined as those in managerial, professional, technical, clerical, and skilled craft occupations. For Germany, the definition comprises skilled manual workers together with **e**mployees in jobs requiring a vocational qualification or comparable training on the job or relevant professional experience, and those in jobs requiring a university degree or higher education.

The German establishment panel identifies whether or not the establishment is bound by an industry-wide agreement, a company agreement concluded by the establishment and the trade unions, or no collective agreement at all.[4] The British data contain two measures of collective bargaining. The first is based on whether there is an

agreement, be it at establishment, organization or sectoral level, to recognize one or more unions to bargain over terms and conditions for employees at the surveyed establishment.[5] This recognition measure is that which has traditionally been used in analyses of establishment unionization in Britain, going back to the first establishment survey in 1980 (Blanchflower *et al*., Forth, 2007). However, in the 1998 and 2004 surveys new questions were introduced inquiring of the establishment manager how pay was set for each single-digit occupational group in the establishment. Specifically, for each occupation present the manager was now asked: "Which of the following statements most closely characterizes the way that pay is set for [occupational group]?" The first three pre-coded answers are: "collective bargaining for more than one employer (e.g. industry-wide agreement)"; "collective bargaining at an organization level"; and "collective bargaining at this establishment." From this information we construct variables identifying any collective bargaining, any sectoral-level collective bargaining, and any firm-level (establishment or organization) collective bargaining.

It is notable that the incidence of collective bargaining is higher using the former 'union recognition' measure than the alternative 'any collective agreement' derived from the occupation-specific tranche of questions (see Table 1 below). This may be because the latter is interpreted by respondents as active collective bargaining during the year of the survey, whereas union recognition may also include establishments where an agreement to negotiate over wages is in place, but where no actual bargaining occurred in the survey year, either because the pay agreement is not due for renewal in that year or because the agreement is dormant (Kersley *et al*., 2006; Millward *et al*., 2000). To obtain a complete picture, although our focus will be upon the conventional union recognition

variable, we shall supplement this discussion with an analysis of collective agreements of any type so as to consider not only the correlates of active bargaining but also how these may differ by bargaining gradient (i.e. industry-level versus establishment/organization-level agreements).

IV MODELING

Our study of union decline between, say, t_0 and t_1 is based on the standard Oaxaca-Blinder decomposition (or multivariate shift-share analysis) in which the outcome of interest Y (here the collective bargaining measure relevant to the establishment) is conditional on a set of observed characteristics X. Further, assuming that Y is generated by a linear additively separable function in observable and unobservable characterisitics, we have (for either country, Germany or Britain)

$$Y_{t_1} = X_{t_1} B_{t_1} + u_{t_1}, \tag{1}$$

and

$$Y_{t_0} = X_{t_0} B_{t_0} + u_{t_0}. \tag{2}$$

The aggregate change in the outcome variable, Δ_t, is therefore (assuming that

$E(u_{t_1} \mid X_{t_1}) = 0$ and $E(u_{t_0} \mid X_{t_1}) = 0$)

$$\Delta_t = y_{t_1} - y_{t_0} = x_{t_1} b_{t_1} - x_{t_0} b_{t_0}, \tag{3}$$

where y denotes the mean outcome, x the mean vector of characteristics, and b the corresponding coefficient estimates, obtained from equations (1) and (2) in separate OLS regressions.

After adding and subtracting $x_t b_t$ (i.e. the counterfactual) from (3), we have the two-component decomposition

$$\Delta_t = (x_{t_1} - x_{t_0})b_{t_0} + x_{t_1}(b_{t_1} - b_{t_0}), \quad (4)$$

where the first term on the right-hand-side gives the 'explained' component; that is, the part of the observed change allocated to differences in observable characteristics (the between or compositional effect) while the second gives the 'unexplained' component (the within or behavioural effect), namely the change in the outcome occasioned by differences in propensities from period t_0 to period t_1.[6]

We are also interested in analyzing differences in outcomes across countries at a given point in time. In this case, and now denoting countries by subscripts (1 for Germany and 0 for Britain), the overall mean gap between the two countries Δ_j at a certain moment in time (i.e. 1998 or 2004) is given by

$$\Delta_j = y_1 - y_0 = (x_1 - x_0)b_0 + x_1(b_1 - b_0), \quad (5)$$

where y and x again denote mean vectors for the dependent and independent variables respectively and b are the coefficient estimates obtained from the separate OLS regressions: $Y_1 = X_1 B_1 + u_1$ and $Y_0 = X_0 B_0 + u_0$.

To keep our implementation as simple as possible, we rely on linear estimates for our decompositions, although as a robustness check we shall also report parenthetically on some nonlinear estimates.

By way of summary, our outcome variable is whether or not the establishment is covered by a collective agreement (or, principally, a recognized union for Britain). We shall also report the cases where the dependent variable measures the presence of a firm or sectoral agreement. Our explanatory variables, common to the two countries, are

industry and establishment size dummies, measures of workforce composition, (skill, gender, and working time status), foreign ownership, single versus multi-site firm status, establishment age, and region.

V FINDINGS

Table 1 presents the means of the variables in 1998 and 2004 and the corresponding percentage point/percentage changes in these values over the period. The first five rows of the table contain the outcome measures, while the establishment characteristics are reported in the remaining rows. Throughout the means are computed using sample weights so as to guarantee their representativeness with respect to the underlying population.

(Table 1 near here)

The incidence of collective bargaining has declined markedly in Britain and Germany (row 1), the percentage point decline being twice as large for union recognition in Britain as it is for collective bargaining in Germany (11.4 versus 5.8 percentage points). The rate of decline – measured as a percentage of collective bargaining in the base period – is one-and-a-half times faster in Britain (viz. 30 percent compared with around 20 percent in Germany). Nevertheless, levels of collective bargaining coverage remain considerably higher in Germany than in Britain throughout the period. In the British case, although the incidence of (any) collective bargaining coverage is lower than union recognition, its recorded absolute and relative decline is higher, a finding consistent with a further 'hollowing out' of union bargaining in Britain.

Sectoral bargaining predominates in Germany: multiemployer agreements are ten times more common than firm agreements. In Britain, on the other hand, sectoral

bargaining appears to be an endangered species – even before the start of our sample period. Firm-level collective bargaining is considerably more stable over time than sectoral bargaining for both countries and its incidence is higher in Britain than in Germany throughout the period. Latterly, it seems that German employers' aversion to collective bargaining is not confined to sectoral bargaining since firm-level bargaining is also in decline.

Table 1 also reviews the other establishment characteristics for both countries that we use in our shift-share analyses. The distribution of establishment size (as measured by number of employees), establishment age, and workforce composition (skill, gender, and hours of work), seem to be quite similar across countries. Differences are apparent with respect to foreign ownership (twice as high in Britain), and industry composition (e.g. the preponderance of the financial sector and hotels and restaurants in Britain, and the greater importance of construction in Germany). There are also sizeable differences in the importance of other business and services and community services in the two countries. However, the biggest difference between Britain and Germany relates to single versus multiple establishment firms: in Germany single establishment firms ('independent' companies) constitute four-fifths of the private sector, as compared with just two-fifths in Britain.

(Table 2 near here)

Table 2 presents the incidence of collective bargaining and union recognition in Germany and Britain by establishment characteristics. In Germany, collective bargaining incidence is above average in sectors like utilities, construction, hotels and restaurants, transport and communications, and financial services. It is below average in

manufacturing, health, education, and other business services. In Britain, utilities, education, health, and transport and communications, education, and health exceed the country mean for recognition. Looking across countries, coverage rates diverge least in utilities, education, and health. For the remaining sectors, coverage is much higher in Germany, often dramatically so. The decline in coverage in Germany is concentrated among establishments with 200 or fewer employees, while in Britain it is concentrated in establishments with 10-20 and 201-999 employees. In both countries the decline in the incidence of collective bargaining and union recognition is to a large extent across-the-board, even if some marked 'individual' differences are apparent.

(Table 3 near here)

The basis of the subsequent decomposition exercise is Table 3, which presents our linear probability estimates of a establishment having a collective agreement of any type (Germany) or a recognized union (Britain).[7] The first column of the table pools the German data for 1998 and 2004. It shows that, all else constant, only the other business services, education, and health sectors evince a statistically significant lower probability of coverage than manufacturing (the reference sector), while the role of establishment size is well-determined (the larger the establishment, the greater the probability of coverage). The fourth column repeats the same pooled analysis for Britain. It indicates that utilities have a higher probability of union recognition than manufacturing, whereas wholesale and retail trade, hotels and restaurants, other business services, and community services all have a lower probability. These results hold, with a few exceptions, for the separate year regressions given in the second/third and fifth/sixth columns for Germany and Britain, respectively. Further, foreign ownership, single establishment status and

establishment 'youth' decrease the probability of being covered, especially in Germany. However, no particular pattern emerges from workforce composition.

The coefficient estimate for the time dummy (2004) of –0.124 for Germany in the first column of the table is a little higher than the observed decline of 11.4 percentage points (earlier reported in Table 1), suggesting that the contribution of the compositional effect to change is likely to be low. Put differently, holding characteristics constant, the coefficient estimate for the time dummy implies a 12.4 percentage point decline, implying that the within-effect will tend to dominate.

In the case of Britain, the coefficient of the time dummy (–0.056) also mirrors quite closely the observed raw decline of 5.8 percentage points (see Table 1) in the union recognition measure over the period 1998-2004. As in the case of Germany, therefore, the compositional effect for Britain is expected to be low as well.

Results for pooled country data are provided in the last three columns of Table 3. In these pooled analyses we reweighted the data so that the British and German establishments contributed an identical number of weighted observations to the analysis. The coefficient estimate for the *German establishment* variable gives the increased probability of an establishment in that country being covered by a collective agreement of any type relative to Britain, having controlled for observable establishment characteristics. In the regression for 1998, for example, this coefficient is equal to 0.453 which is slightly higher than the observed 1998 gap between the two countries of 0.422 (again consult Table 1). For 2004, as can be seen from the final column of the table, the disparity is larger: 0.422 rather than 0.366 (Table 1). (Note that the coefficient estimate for the *German establishment* variable in the seventh column of the table is roughly the

average of the 1998 and 2004 coefficients reported in the separate regressions.) The implication is that there is something about being in Germany, rather than Britain, and not accounted for by characteristics at establishment-level that markedly elevate the probability of collective bargaining coverage. This latter result will of course come as no surprise to proponents of the varieties-of-capitalism school who tend to emphasize the role of macro-institutional features and political economy considerations. Finally, the time dummy of –8.1 percent very roughly approximates the observed decline in the German-British union representation gap of 5.6 percentage points earlier shown in Table 1.

(Table 4a near here)

Our multivariate shift-share analysis is summarized in panels (a) through (d) of Table 4a. The estimates are derived from the decomposition exercise described in equation (4) by type of collective bargaining coverage. Rows (5)-(8) of each panel give the proportions of the observed change in outcome that are due to the compositional effect and the within-effect, respectively. The compositional effect is computed assuming two distinct base-year (1998 and 2004) propensities as reference categories, while the within-effect is, by definition, simply the difference between the actual change and the compositional effect. These effects are computed for Germany and Britain from separate regressions. All estimates are statistically significant at conventional levels.

The most striking feature of the table is the magnitude of the within-effect throughout. In the case of Germany, for example, had the propensities (1998 coefficients) assumed the same level in 1998 and 2004, collective bargaining coverage would have been virtually unchanged over the sample period (63.7 percent rather than 62.5 percent).

Given that the observed coverage rate in 2004 is 51.1 percent, it follows that the decline in collective bargaining coverage in Germany is due in its entirety to a change in behaviour. If anything, changes in the characteristics of establishments over the period were actually favourable toward collective bargaining as the within effect is 110.9 percent in row (6). Using the 2004 coefficients, the within-effect would be slightly smaller at 105.9 percent, row (8). As shown in panels (c) and (d), these results also hold for the cases of sectoral bargaining and firm-level agreements, respectively.

In Britain, the within-effect is also the major driving force in explaining the change in union recognition over time, accounting for nearly 80 percent of the observed decline in the case where 1998 coefficients are the reference category. Using 2004 coefficients yields even a larger within-effect. In the case of panels (b) through (d), that now refer to union coverage – our secondary measure of collective bargaining in Britain – the small magnitudes involved (just 10.6 percent of plants were covered by any type of collective bargaining in 2004 compared with 16.9 percent in 1998) imply a very large effect even if the underlying changes are small. Nevertheless, for this measure the within-effect plays an even larger role than for union recognition.

We note parenthetically that these results are robust to model specification. In Appendix Table 1, we show the results of a decomposition exercise in which a 'full' model is specified for each country and are again able to point to the dominance of the within-effect, albeit with a fairly pronounced tendency for the contribution of compositional change to be higher in the case of Britain in the first and second columns.[8]

Neither do our results seem to be sensitive to weighting. In Appendix Table 2 we replicate Table 4a with unweighted data. Despite the fact that the unweighted figures on

collective agreement coverage and union recognition are obviously higher – large establishments are over-represented in both surveys and size and coverage are positively correlated – the share of the within-effect is pretty much the same: 108.6 percent for Germany and 78.2 percent for Britain in the unweighted case, and 110.9 percent and 78.2 percent in the weighted case (see Table 4a), respectively. Accordingly the primacy of the within-effect is undisturbed if we work with unweighted data.

Finally, we checked whether there was any particular variable (or set of variables) driving the results of our decomposition. A more 'detailed' decomposition was implemented using the procedure made available by Jann (2008), and is remitted to Appendix Tables 3a and 3b.[9] We also thought it worthwhile to examine the sensitivity of this particular decomposition exercise to the choice of the reference category. To this end, the results are grouped into three distinct columns, depending on whether the base-year coefficients are 1998, 2004, or from the pooled (1998 and 2004) sample, respectively. As is apparent from these tables, which focus on the dependent variable 'any collective bargaining', there are no particularly striking results at this level of disaggregation. Rather, it is the case that some compositional effects pull in opposite directions, cancelling each other out to some extent. Further, none of the individual effects is sufficiently marked to merit special attention here, not least because all of the effects are individually rather small quantitatively.

(Table 4b near here)

We have noted that the gap in collective bargaining coverage between Germany and Britain is roughly 40 percentage points and that this gap does not change very much over the period. We can use our estimates to answer the question: had British

establishments been endowed with the German characteristics would they have had the (high) German collective bargaining coverage? Table 4b shows the results of this exercise, using either the German or the British propensities as reference categories. We find that differences in the distribution of observable establishment characteristics across Germany and Britain account for around one-tenth of the disparity in collective bargaining across countries. Accordingly, when using German propensities, roughly 90 percent is due to differences in the betas for each characteristic in the two countries. Despite differences in magnitude when using British rather than German coefficients, the results in rows (7) and (8) indicate that the within-effect continues to dominate. This 'unexplained' component, often attributed to discrimination in the gender wage gap literature, may here be attributable to employer tastes for union wage setting, due in part to very different historical, political and industrial relations institutions in Germany relative to Britain.

These results also hold up rather well in the case of any type of collective agreement (shown in panel (b)) or sectoral agreements (panel (c)). Interestingly, the small German-British gap in firm-level bargaining (panel (d)) shows an opposite pattern: the compositional effect is dominant in both 1998 and 2004. Thus, holding establishment characteristics constant, the two countries have roughly the same propensities to engage in firm-level agreements.[10]

(Table 5 near here)

Finally, Table 5 presents a counterfactual exercise in which the German (British) coefficients or propensities are applied to British (German) characteristics in each of the two sample years, 1998 and 2004. The exercise is carried out for all selected outcome

variables, and the most interesting finding, as shown in the first two columns of the table, is that Britain would very much resemble Germany if the British establishments recorded the same 'behaviour' as their German counterparts. In 1998**,** for example, the gap between the observed collective bargaining coverage in Germany and the counterfactual coverage rate would be a striking 3.3 percentage points (or 62.5–59.2); whereas in 2004 it would be 4.2 percentage points (51.1 – 46.9). Over time, the percentage point change of –12.3 would, in turn, broadly mimic the observed percentage point change of –11.4 (Table 4a, panel (a)).

Applying the British propensities to Germany establishments produces a British-like situation, although with less 'precision' than in the previous exercise. In fact, as the last two columns of the table demonstrate, the figures in panels (a) through (e) tend to be lower than the corresponding values observed for Britain in either 1998 or 2004 (again refer to Table 4a). We can mostly attribute this larger gap to differences in the mean of the *single establishment* variable**.** As a practical matter, replication of the last two columns purged of this variable yields a much smaller difference between observed and counterfactual coverage rates of roughly 3 percentage points. (Counterfactual results without the single-establishment dummy are available from the authors upon request.) In any event, note that the 1998-2004 percentage point changes reported in Table 5 are very much in line with the observed changes reported in Table 4a. Consequently, the main results are as follows: first, in both countries establishment behaviour changes very little through time; and, second, the two countries differ substantially in their behaviour for a given set of establishment characteristics. *Vulgo*: propensities by country mean everything in terms of cross-country differences in collective bargaining.[11]

VI CONCLUSIONS

We have charted the incidence of and changes in collective bargaining between 1998 and 2004, estimating a common model of the determinants of coverage for Germany and Britain, both severally and jointly. Ours is the first comparative study seeking to understand the factors behind the recent, substantial decline in private sector collective bargaining in Germany and Britain. Our treatment does four things. First, it quantifies the extent of that decline at the level of the establishment. Second, it establishes the role of compositional change in establishment characteristics in contributing to this decline.[12] Third, it considers the extent to which differences in establishment characteristics across Germany and Britain can account for the gap in the frequency of collective bargaining between the two countries. Finally, the results are supported in sensitivity analyses.

We find evidence of a strong and persistent decline in collective bargaining in Germany and Britain since the late 1990s. By 2004, just over 50 percent of German establishments were covered by a collective agreement, down 11 percentage points on six years earlier. At around 15 percent, the union recognition rate in Britain was less than one-third that of Germany, having fallen by over one-quarter in the previous six years. Projecting this 6-year rate of decline forward another six years to 2010 implies only 40 percent of German private-sector establishments will be covered by any type of collective agreement while the rate in Britain will be around 10 percent.

We have found that the decline in collective bargaining incidence in both countries is mostly due to changes in behaviour rather than to compositional effects. This outcome is not particularly surprising since establishment characteristics have not changed that much over this relatively short time frame. Nevertheless, it is striking that

the decline is apparent in virtually every type of establishment, albeit to different degrees. There are few, if any, impregnable bastions of unionism left in these two nations.

A comparison of establishment characteristics across Germany and Britain revealed a number of substantial differences, perhaps the most important of which was the much greater incidence of single independent establishments in the former country. The lower propensity of single-establishment firms to embrace collective bargaining compared with their multi-site counterparts suggests that the gap in collective bargaining between Germany and Britain might get even bigger if such differences were accounted for. Yet, compositional differences in establishment characteristics accounted for about one-tenth of the 40 percentage point gap in collective bargaining incidence between Germany and Britain. The rest, manifested in pooled country equations as a large coefficient estimate for the 'Germany' dummy, remains unexplained. But the British deficit is likely to capture country-level differences in history, culture and institutions, as well as some residual unobserved establishment-level factors. Interestingly, the size of the 'Germany' effect remained relatively stable over the period under investigation.

Although the rate of union decline is faster in Britain than in Germany and began earlier, it is possible that the decline in Germany will unfold in much the same way as it has done in Britain. Unionization is traditionally well-established in the manufacturing sector, but the decline in unionization across all types of establishment and all industries suggests that the higher incidence of manufacturing in Germany relative to Britain is unlikely to afford unions much protection.

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ENDNOTES

[1] We also considered the course of workplace representation in works councils (Germany) and joint consultative committees (Britain). Space constraints rule out presentation of this part of our analysis but results are available from the authors upon request**.**

[2] For a moment-in-time analysis of the determinants of 'never membership' in German trade unions, see Schnabel and Wagner (2006).

[3] Large plants are oversampled but the sampling within each cell is random.

[4] The German survey goes on to ask of those establishments *not* bound by a collective agreement whether or not they nevertheless orient themselves toward an industry-wide collective agreement. We do not exploit this potentially interesting distinction here.

[5] Once the survey interviewer has established that there is a union at the establishment the manager is asked: "Is the [NAME OF UNION] recognized by management for negotiating pay and conditions for any sections of the workforce in this establishment? (*INTERVIEWER*: If agreements are negotiated with the union at a higher level in the organisation or by an employers association, but apply to union/staff association members here, count as recognized)."

[6] We do not implement a three-component decomposition which can be derived similarly to yield $\Delta_t = (x_{t_1} - x_{t_0})b_{t_0} + x_{t_0}(b_{t_1} - b_{t_0}) + (x_{t_1} - x_{t_0})(b_{t_1} - b_{t_0})$, where the third term is the interaction of the composition and within-group effects. Consistent with the literature, our assumption is that the third term is neglible.

[7] Similar regressions for the other outcome variables – any collective agreement for Britain, and sectoral- and firm-level agreements for both countries – are available on request.

[8] Although the extended set of regressors in Appendix Table 1 is limited to the addition of industry and regional controls in the case of Germany and regional and detailed

workforce composition controls in the case of Britain, there is a good reason for this: we seek to keep the specifications for the two countries as close as possible to facilitate comparisons between them. Also, in the interests of economy, the 1998 coefficients are the sole reference category used here (as is also true for Appendix Table 2).

[9] See Fortin, Lemieux, and Firpo (2010) for an insightful survey on Oaxaca-Blinder decomposition methods.

[10] Again, although the results show some sensitivity with respect to the selected reference group, the dominance of the between-effect in the case of firm-level agreements is pretty clear.

[11] As mentioned in the modeling section, there is no reason to suspect that the OLS simplification is flawed. However, as a final check, we report in Appendix Table 4 the results of fitting a probit model to the data. Again in the interests of economy we only replicate the case identified in Table 4a. It is apparent that there are virtually no differences between the two sets of estimates.

[12]Interestingly, the only other study to use this establishment-based approach, and which covers a 24-year period of decline, recoups much the same percentage change attributable to compositional change as do we for the country in question (Britain).

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Table 1
Establishment mean characteristics in Germany and Britain, survey-weighted data, 1998 and 2004

	Germany				*Britain*			
Variables	1998	2004	p.p.c.	p.c.	1998	2004	p.p.c.	p.c.
Any collective agreement/union recognition	62.5	51.1	-11.4	-18.2	20.3	14.5	-5.8	-28.7
Any collective agreement	62.5	51.1	-11.4	-18.2	16.9	10.6	-6.3	-37.2
Sectoral-level agreement	56.9	47.1	-9.8	-17.2	4.2	1.8	-2.4	-57.2
Firm-level agreement	5.6	4.0	-1.6	-28.5	8.3	7.7	-0.6	-7.4
Manufacturing	25.8	21.4	-4.4	-17.1	17.6	14.4	-3.2	-18.2
Utilities	0.4	0.7	0.3	72.1	0.2	0.2	-0.1	-26.2
Construction	15.4	10.6	-4.8	-30.9	6.5	5.0	-1.5	-23.0
Wholesale and retail trade	26.3	25.6	-0.7	-2.5	25.5	25.8	0.3	1.1
Hotels and restaurants	6.6	6.7	0.1	1.2	10.6	11.0	0.4	4.2
Transport and communications	5.6	6.7	1.1	20.2	5.3	5.3	0.0	0.8
Financial services	0.9	1.8	0.9	91.4	12.9	13.5	0.6	4.6
Other business services	11.3	16.1	4.8	42.0	5.7	7.3	1.5	26.7
Education	0.9	0.9	0.0	1.5	2.9	1.3	-1.6	-54.9
Health	4.8	6.5	1.7	36.4	3.8	4.2	0.4	10.4
Community services	2.0	3.0	1.0	50.0	9.0	12.0	3.0	33.7
Leading region	74.2	81.7	7.6	10.2	29.2	25.8	-3.4	-11.7
Size 10-20	58.8	56.3	-2.5	-4.3	52.8	51.5	-1.3	-2.5
Size 21-100	34.6	36.5	1.9	5.5	38.6	40.6	2.0	5.1
Size 101-200	3.8	4.2	0.4	11.9	5.1	4.5	-0.6	-11.7
Size 201-499	2.1	2.3	0.2	11.7	2.7	2.6	-0.1	-4.4
Size 500-999	0.4	0.5	0.1	13.6	0.6	0.6	0.0	3.4
Size ≥1, 000	0.3	0.2	0.0	-4.0	0.2	0.2	0.0	-9.1
Foreign owned	3.1	4.2	1.1	35.5	7.7	11.3	3.7	47.6
Single establishment	81.3	77.9	-3.3	-4.1	40.2	38.1	-2.1	-5.2
Establishment older than 10 years	69.7	77.6	7.8	11.2	66.9	72.9	6.0	8.9
Proportion female workers	39.7	41.5	1.8	4.5	47.9	48.4	0.5	1.1
Proportion part-time workers	21.8	20.3	-1.5	-6.7	28.6	30.4	1.8	6.4
Proportion skilled workers	57.0	62.8	5.8	10.1	54.6	46.9	-7.7	-14.0

*Source*s: IAB Establishment Panel; WERS 1998 and 2004.
Notes: p.p.c. and p.c. denote percentage point change and percentage change in the mean values, respectively. All variables are 1, 0 dummies, with mean values given in percentages.

Table 2
Incidence of collective bargaining of any type/union recognition in Germany and Britain by establishment characteristics, weighted data, 1998 and 2004

Variables	*Germany (Collective agreement)*			*Britain (Union recognition)*		
	1998	2004	p.p c.	1998	2004	p.p c.
Manufacturing	56.7	44.9	-11.8	16.8	8.9	-7.9
Utilities	96.8	73.3	-23.5	97.9	94.9	-3.0
Construction	76.1	73.8	-2.3	24.2	9.4	-14.8
Wholesale and retail trade	70.9	59.7	-11.2	14.7	9.8	-4.9
Hotels and restaurants	85.4	66.3	-19.1	2.6	0.3	-2.3
Transport and communications	77.1	55.4	-21.7	33.5	19.6	-13.9
Financial services	81.2	79.4	-1.8	24.8	33.1	8.3
Other business services	23.8	24.0	0.2	6.3	1.7	-4.6
Education	30.7	33.3	2.6	43.8	26.1	-17.7
Health	41.1	33.5	-7.6	31.2	11.7	-19.5
Community services	78.5	34.0	-44.5	9.9	14.5	4.6
Leading region	68.2	54.7	-13.5	12.7	11.0	-1.7
Size 10-20	56.2	49.2	-7.0	33.1	21.3	-11.8
Size 21-100	68.4	56.5	-11.9	19.4	16.3	-3.1
Size 101-200	81.3	65.2	-16.1	38.8	36.8	-2
Size 201-499	78.8	78.0	-0.8	54.8	48.3	-6.5
Size 500-999	94.8	88.5	-6.3	61.4	43.8	-17.6
Size ≥1000	98.5	95.0	-3.5	66.6	61.1	-5.5
Foreign owned	61.8	53.3	-8.5	15.8	14.2	-1.6
Single establishment	59.9	46.9	-13	12.4	4.8	-7.6
Establishment older than 10 years	67.9	54.2	-13.7	19.8	16.7	-3.1

*Source*s: IAB Establishment Panel; WERS 1998 and 2004.
Note: See notes to Table 1.

Table 3

Linear probability estimates of an establishment having a collective agreement of any type/union recognition in Germany and Britain, weighted data, 1998 and 2004

	Germany			*Britain*			*Pooled data*		
Variables	1998 and 2004	1998	2004	1998 and 2004	1998	2004	1998 and 2004	1998	2004
Utilities	0.230 ***	0.317 ***	0.182 ***	0.566 ***	0.500 ***	0.634 ***	0.288 ***	0.376 ***	0.242 ***
	(0.046)	(0.061)	(0.053)	(0.048)	(0.073)	(0.062)	(0.042)	(0.057)	(0.053)
Construction	0.294 ***	0.276 ***	0.312 ***	-0.540	-0.073	-0.051	0.162 ***	0.149 ***	0.174 ***
	(0.031)	(0.047)	(0.035)	(0.064)	(0.116)	(0.049)	(0.033)	(0.057)	(0.031)
Wholesale and retail trade	0.114 ***	0.147 ***	0.082 **	-0.197 ***	-0.220 ***	-0.171 ***	-0.012	-0.001	-0.020
	(0.032)	(0.051)	(0.035)	(0.425)	(0.073)	(0.412)	(0.027)	(0.046)	(0.027)
Hotels and restaurants	0.275 ***	0.320 ***	0.226 ***	-0.296 ***	-0.379 ***	-0.234 ***	-0.028	-0.018	-0.032
	(0.049)	(0.075)	(0.059)	(0.047)	(0.086)	(0.043)	(0.036)	(0.062)	(0.036)
Transport and	0.127 ***	0.214 ***	0.061	-0.159	-0.003	-0.033	0.065 *	0.012 *	0.027
communications	(0.041)	(0.059)	(0.049)	(0.065)	(0.117)	(0.056)	(0.037)	(0.067)	(0.036)
Financial services	0.192 ***	0.181	0.186 ***	0.225	-0.076	0.114 **	0.095 **	0.024	0.148 ***
	(0.060)	(0.110)	(0.062)	(0.051)	(0.083)	(0.056)	(0.040)	(0.065)	(0.045)
Other business services	-0.257 ***	-0.314 ***	-0.232 ***	-0.216 ***	-0.268 ***	-0.162 ***	-0.263 ***	-0.311 ***	-0.230 ***
	(0.033)	(0.061)	(0.032)	(0.044)	(0.080)	(0.040)	(0.029)	(0.053)	(0.027)
Education	-0.167 *	0.160	-0.185 **	0.087	0.121	0.025	0.015	0.072	-0.058
	(0.097)	(0.187)	(0.086)	(0.105)	(0.152)	(0.095)	(0.087)	(0.145)	(0.064)
Health	-0.140 **	-0.142	-0.151 **	-0.045	0.031	-0.096	-0.104 **	-0.055	-0.137 ***
	(0.067)	(0.129)	(0.063)	(0.073)	(0.134)	(0.062)	(0.052)	(0.102)	(0.046)
Community services	0.000	0.261 ***	-0.137 **	-0.127 **	-0.202 **	-0.069	-0.045	-0.052	-0.040
	(0.066)	(0.090)	(0.060)	(0.050)	(0.080)	(0.056)	(0.036)	(0.059)	(0.040)
Leading region	0.211 ***	0.231 ***	0.197 ***	-0.072 ***	-0.101 ***	-0.061 ***	0.050 ***	0.056 **	0.045 ***
	(0.019)	(0.033)	(0.020)	(0.019)	(0.034)	(0.022)	(0.015)	(0.026)	(0.016)

Size 21-100	0.102	***	0.098	***	0.101	***	0.030		0.005		0.061	**	0.069	***	0.062	**	0.078	***
	(0.019)		(0.031)		(0.022)		(0.024)		(0.042)		(0.024)		(0.016)		(0.029)		(0.017)	
Size101-200	0.206	***	0.219	***	0.186	***	0.183	***	0.165	***	0.208	***	0.202	***	0.217	***	0.195	***
	(0.025)		(0.038)		(0.030)		(0.034)		(0.533)		(0.044)		(0.022)		(0.035)		(0.028)	
Size 201-499	0.271	***	0.217	***	0.303	***	0.302	***	0.294	***	0.321	***	0.306	***	0.295	***	0.321	***
	(0.028)		(0.048)		(0.029)		(0.034)		(0.055)		(0.043)		(0.023)		(0.039)		(0.027)	
Size 500-999	0.406	***	0.343	***	0.421	***	0.296	***	0.355	***	0.265	***	0.364	***	0.400	***	0.343	***
	(0.028)		(0.041)		(0.035)		(0.043)		(0.069)		(0.054)		(0.028)		(0.044)		(0.035)	
Size ≥1000	0.386	***	0.321	***	0.424	***	0.402	***	0.399	***	0.414	***	0.400	***	0.384	***	0.419	***
	(0.027)		(0.043)		(0.031)		(0.049)		(0.081)		(0.063)		(0.030)		(0.051)		(0.035)	
Foreign owned	-0.113	***	-0.134		-0.104	**	-0.104	***	-0.149	***	-0.067	**	-0.110	***	-0.155	***	-0.086	***
	(0.041)		(0.082)		(0.041)		(0.027)		(0.046)		(0.032)		(0.024)		(0.041)		(0.027)	
Single establishment	-0.120	***	-0.084	**	-0.148	***	-0.162	***	-0.174	***	-0.139	***	-0.135	***	-0.127	***	-0.137	***
	(0.041)		(0.035)		(0.025)		(0.024)		(0.043)		(0.023)		(0.018)		(0.033)		(0.018)	
Establishment older than	0.085	***	0.093	**	0.076	***	0.023		-0.016		0.069	***	0.065	***	0.056	*	0.077	***
10 years	(0.025)		(0.042)		(0.029)		(0.027)		(0.048)		(0.022)		(0.019)		(0.033)		(0.018)	
Proportion female workers	0.027		0.045		0.023		-0.016		-0.072		0.026		0.050		0.056		0.053	
	(0.048)		(0.084)		(0.052)		(0.052)		(0.095)		(0.050)		(0.036)		(0.068)		(0.036)	
Proportion part-time	0.012		-0.091		0.069		0.084	*	0.122		0.053		0.000		-0.044		0.031	
workers	(0.057)		(0.097)		(0.063)		(0.051)		(0.095)		(0.050)		(0.039)		(0.073)		(0.040)	
Proportion skilled workers	0.103	***	0.073		0.110	**	-0.046		-0.002		-0.080	*	0.000		0.004		0.000	
	(0.037)		(0.057)		(0.044)		(0.041)		(0.069)		(0.044)		(0.029)		(0.049)		(0.032)	
Time dummy (2004)	-0.124	***					-0.056	**					-0.081	***				
	(0.019)						(0.022)						(0.015)					
German establishment													0.435	***	0.453	***	0.422	***
													(0.018)		(0.032)		(0.018)	

Constant	0.320 ***	0.293 ***	0.238 ***	0.363 ***	0.443 ***	0.216 ***	0.153 ***	0.154 *	0.059
	(0.049)	(0.075)	(0.056)	(0.074)	(0.120)	(0.057)	(0.048)	(0.084)	0.0398
Obs.	10,686	3,552	7,134	2,991	1,502	1,489	13,677	7,134	8,623
R^2	0.20	0.22	0.18	0.17	0.18	0.19	0.27	0.18	0.26

*Source*s: IAB Establishment Panel; WERS 1998 and 2004.
Notes: *,** and *** denote significance at the 10%, 5%, and 1% levels, respectively. 'Manufacturing' and 'Size 10-20' are the reference industry and employment size categories, respectively.

Table 4a

Within versus compositional change in Germany and Britain by type of agreement, weighted data, 1998 and 2004 (in percentage)

		Germany		Britain	
		1998	2004	1998	2004
	(a) Collective agreement of any type/union recognition				
(1)	Observed coverage rate (%)	62.5	51.1	20.3	14.5
(2)	Percentage point change, 1998-2004		-11.4		-5.8
(3)	2004 (predicted) coverage based on 1998 coefficients		63.7		19.0
			(0.005)		(0.006)
(4)	1998 (predicted) coverage based on 2004 coefficients	50.5		13,7	
		(0.007)		(0.007)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.2		-1.3
			(0.011)		(0.012)
			-10.9%		21.8%
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-12.6		-4.6
			(0.019)		(0.022)
			110.9%		78.2%
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.7		0.8
			(0.009)		(0.010)
			-5.9%		-13.2%
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-12.0		-6.6
			(0.019)		(0.023)
			105.9%		113.2%
	(b) Collective agreement of any type				
(1)	Observed coverage rate (%)	62,5	51.1	16.9	10.6
(2)	Percentage point change, 1998-2004		-11.4		-6.3
(3)	2004 (predicted) coverage based on 1998 coefficients		63.7		17.0
			(0.005)		(0.005)
(4)	1998 (predicted) coverage based on 2004 coefficients	50,5		10.5	
		(0.007)		(0.005)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.2		0.1
			(0.011)		(0.011)
			-10.9%		-1.6%
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-12.6		-6.4
			(0.019)		(0.020)
			110.9%		101.6%
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.7		0.1
			(0.009)		(0.007)
			-5.9%		-2.2%
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-12.0		-6.4
			(0.019)		(0.020)
			105.9%		102.2%

	(c) Sectoral-level agreement				
(1)	Observed coverage rate (%)	56.9	47.1	4.2	1.8
(2)	Percentage point change, 1998-2004		-9.8		-2.4
(3)	2004 (predicted) coverage based on 1998 coefficients		58.0 (0.005)		3.5 (0.002)
(4)	1998 (predicted) coverage based on 2004 coefficients	46.5 (0.007)		1.8 (0.001)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.0 (0.011) -10.5%		-0.7 (0.005) 29.7%
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-10.8 (0.019) 110.5%		-1.7 (0.010) 70.3%
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.6 (0.009) -6.1%		0.0 (0.002) 1.3%
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-10.4 (0.019) 106.1%		-2.4 (0.012) 98.7%
	(d) Firm-level agreement				
(1)	Observed coverage rate (%)	5.6	4.0	8.3	7.7
(2)	Percentage point change, 1998-2004		-1.6		-0.6
(3)	2004 (predicted) coverage based on 1998 coefficients		5.8 (0.001)		8.3 (0.003)
(4)	1998 (predicted) coverage based on 2004 coefficients	3.9 (0.002)		7.3 (0.004)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		0.2 (0.004) -13.3%		0.0 (0.006) 0.0%
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-1.8 (0.009) 113.3%		-0.6 (0.014) 100.0%
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.1 (0.003) -4.4%		0.5 (0.006) -72.6%
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-1.7 (0.008) 104.4%		-1.1 (0.014) 172.6%

Source: IAB Establishment Panel; WERS, 1998 and 2004.
Notes: For each panel, row (3) is given by [x_04*b_98] and row (4) by [x_98*b_04]; row (5), the between-effect, is given by [$(x\_04 - x\_98)*b\_98$], or row (3) minus row (1) in 1998, while row (6), the within-effect, is given by [$x\_04*(b\_04 - b\_98)$], or row (2) minus row (4). Finally, row (7) is given by [$(x\_04 - x\_98)*b\_04$] and row (8) by [$x\_98*(b\_04 - b\_98)$]. x denotes the observed mean characteristics and b the estimated coefficients in the corresponding year. Standard errors are in parentheses.

Table 4b
Within versus compositional change by type of agreement and by year, weighted data, 1998 and 2004

	1998		2004	
(a) Collective agreement of any type/union recognition	Germany	Britain	Germany	Britain
(1) Observed coverage rate (%)	62.5	20.3	51.1	14.5
(2) Percentage point gap (Germany-Britain)		42.2		36.6
(3) Predicted coverage based on German propensities		59.2		46.8
		(0.010)		(0.008)
(4) Predicted coverage based on British propensities	9.9		2.6	
	(0.006)		(0.003)	
(5) Percentage point gap due to differences in characteristics (using German propensities)		3.3		4.3
		(0.030)		(0.021)
		7.8%		11.8%
(6) Percentage point gap due to changes in behaviour (using German propensities)		38.9		32.3
		(0.036)		(0.024)
		92.2%		88.2%
(7) Percentage point gap due to differences in characteristics (using British propensities)	-10.4		-11.9	
	(0.028)		(0.019)	
	-24.6%		32.5%	
(8) Percentage point gap due to changes in behaviour (using British propensities)	52.6		48.5	
	(0.035)		(0.020)	
	124.6%		132.5%	
(b) Collective agreement of any type				
(1) Observed coverage rate (%)	62.5	16.9	51.1	10.6
(2) Percentage point gap (Germany-Britain)		45.6		40.5
(3) Predicted coverage based on German propensities		59.2		47.0
		(0.010)		(0.008)
(4) Predicted coverage based on British propensities	7.6		3.0	
	(0.005)		(0.002)	
(5) Percentage point gap due to differences in characteristics		-3.3		4.1
		(0.030)		(0.021)
		7.1%		10.2%
(6) Percentage point gap due to changes in behaviour		42.3		36.4
		(0.034)		(0.024)
		92.9%		89.8%
(7) Percentage point gap due to differences in characteristics (using British propensities)	-9.3		-7.6	
	(0.026)		(0.016)	
	-20.4%		-18.8%	
(8) Percentage point gap due to changes in behaviour (using British propensities)	54.9		48.1	
	(0.030)		(0.019)	
	120.4%		118.8%	

(c) Sectoral-level agreement				
(1) Observed coverage rate (%)	56.9	4.2	47.1	1.8
(2) Percentage point gap (Germany-Britain)		52.8		45.4
(3) Predicted coverage based on German propensities		51.0		40.3
		(0.011)		(0.008)
(4) Predicted coverage based on British propensities	1.5		0.7	
	(0.002)		(0.001)	
(5) Percentage point gap due to differences in characteristics		5.9		6.8
		(0.030)		(0.022)
		11.3%		15.1%
(6) Percentage point gap due to changes in behaviour		46.8		38.5
		(0.031)		(0.022)
		88.7%		84.9%
(7) Percentage point gap due to differences in characteristics (using British propensities)	-2.7		-1.1	
	(0.015)		(0.006)	
	-5.1%		-2.4%	
(8) Percentage point gap due to changes in behaviour (using British propensities)	55.5		46.5	
	(0.021)		(0.013)	
	105.1%		102.4%	
(d)Firm -level agreement				
(1) Observed coverage rate (%)	5.6	8.3	4.0	7.7
(2) Percentage point gap (Germany-Britain)		-2.8		-3.7
(3) Predicted coverage based on German propensities		8.2		6.7
		(0.003)		(0.002)
(4) Predicted coverage based on British propensities	1.5		1.8	
	(0.003)		(0.002)	
(5) Percentage point gap due to differences in characteristics		-2.7		-2.7
		(0.011)		(0.007)
		96.8%		72.5%
(6) Percentage point gap due to changes in behaviour		-0.1		-1.0
		(0.015)		(0.012)
		3.2%		27.5%
(7) Percentage point gap due to differences in characteristics (using British propensities)	-6.8		-5.9	
	(0.015)		(0.014)	
	242.9%		159.5%	
(8) Percentage point gap due to changes in behaviour (using British propensities)	4.0		2.2	
	(0.013)		(0.013)	
	-142.9%		-59.5%	

Notes: For each panel, row (3) is given by x_B*b_G, while rows (5) and (6) are given by $(x\_G - x\_B)*b\_G$ (the between-effect) and $x\_B*(b\_G - b\_B)$ (the within-effect), respectively; In turn, row (4) is given by x_G*b_B, while rows (7) and (8) are given by $(x\_G - x\_B)*b\_B$ (the between-effect) and $x\_G*(b\_G - b\_B)$ (the within-effect). *B* and *G* denote Britain and Germany; *x* denotes the observed mean characteristics; and *b* gives the estimated coefficients in the corresponding year. See equation (5) in the text. Standard errors in parenthesis.

Table 5
Counterfactual coverage rates in Germany and Britain

	German propensities with British characteristics		British propensities with German characteristics	
	1998	2004	1998	2004
(a)Collective agreement of any type/union recognition				
(1) Counterfactual coverage rate (%)	59.2	46.9	9.9	2.6
(2) Percentage point decline (2004-1998)		-12.3		-7.3
(b) Collective agreement of any type				
(1) Counterfactual coverage rate (%)	59.2	46.9	7.6	3.0
(2) Percentage point decline (2004-1998)		-12.3		-4.6
(c) Sectoral-level agreement				
(1) Counterfactual coverage rate (%)	51.0	40.3	1.5	0.7
(2) Percentage point decline (2004-1998)		-10.7		-0.8
(d) Firm-level agreement				
(1) Counterfactual coverage rate (%)	8.2	6.7	1.6	1.8
(2) Percentage point decline (2004-1998)		-1.6		0.2

Notes: In each panel, the counterfactual coverage rate in the first and second columns is given by *x_B*b_G* and *x_G*b_B*, respectively; *B* and *G* denote Britain and Germany; *x* denotes the observed mean characteristics; and *b* gives the estimated coefficients in the corresponding year.

Appendix Table 1
Within versus compositional change in Germany and Britain, weighted data, 1998 and 2004, full specification

	Collective agreement of any type /union recognition			*Sectoral agreement*			*Firm-level agreement*		
	1998	2004		1998	2004		1998	2004	
Germany									
(1) Observed coverage rate (%)	62.5	51.8		56.9	47.8		5.6	4.0	
(2) Percentage point change, 1998-2004		-10.7			-9.1			-1.6	
(3) 2004 (predicted) coverage based on 1998 coefficients		65.0			59.5			5.5	
(4) Percentage point change due to changes in characteristics		2.5	(-23.6%)		2.6	(-28.6%)		-0.1	(4.4%)
(5) Percentage point change due to changes in behaviour		-13.3	(123.6%)		-11.8	(128.6%)		-1.5	(95.6%)
Britain									
(1) Observed coverage rate (%)	19.7	14.6		4.2	1.8		8.2	7.7	
(2) Percentage point change, 1998-2004		-5.1			-2.4			-0.5	
(3) 2004 (predicted) coverage based on 1998 coefficients		17.6			3.2			8.4	
(4) Percentage point change due to changes in characteristics		-2.2	(41.9%)		-1.0	(39.3%)		0.2	(-34.7%)
(5) Percentage point change due to changes in behaviour		-2.98	(58.1%)		-1.5	(60.7%)		-0.7	(134.7%)

Sources: IAB Establishment Panel; WERS, 1998 and 2004.
Notes: See notes to Table 4a. The model includes an extended set of industry and regional dummies for Germany and in the case of Britain detailed regional and workforce composition dummies.

Appendix Table 2
Within versus compositional change in Germany and Britain by type of agreement, unweighted data, 1998-2004

	Germany		*Britain*	
	1998	2004	1998	2004
(a) Collective agreement of any type/union recognition				
(1) Observed coverage rate (%)	69.3	57.7	39.1	33.6
(2) Percentage point change, 1998-2004		-11.6		-5.5
(3) 2004 (predicted) coverage based on 1998 coefficients		70.3		37.9
(4) Percentage point change due to changes in characteristics		1.0		-1.2
		(-8.6%)		(21.8%)
(5) Percentage point change due to changes in behaviour		-12.6		-4.3
		(108.6%)		(78.2%)
(b) Collective agreement of any type				
(1) Observed coverage rate (%)	69.3	57.7	35.0	28.0
(2) Percentage point change, 1998-2004		-11.6		-7.0
(3) 2004 (predicted) coverage based on 1998 coefficients		70.3		33.9
(4) Percentage point change due to changes in characteristics		1.0		-1.1
		(-8.6%)		(15.7%)
(5) Percentage point change due to changes in behaviour		-12.6		-5.9
		(108.6%)		(84.3%)
(c) Sectoral-level agreement				
(1) Observed coverage rate (%)	58.3	48.8	5.4	4.9
(2) Percentage point change, 1998-2004		-9.5		-0.5
(3) 2004 (predicted) coverage based on 1998 coefficients		61.5		4.8
(4) Percentage point change due to changes in characteristics		3.2		-0.6
		(-33.7%)		(120.0%)
(5) Percentage point change due to changes in behaviour		-12.7		0.1
		(133.7%)		(-20.0%)
(d) Firm-level agreement				
(1) Observed coverage rate (%)	11.0	9.0	26.3	22.1
(2) Percentage point change, 1998-2004		-2.0		-4.2
(3) 2004 (predicted) coverage based on 1998 coefficients		8.8		25.4
(4) Percentage point change due to changes in characteristics		-2.2		-0.9
		(110.0%)		(21.4%)
(5) Percentage point change due to changes in behaviour		0,2		-3.3
		(-10.0%)		(78.6%)

Notes: See notes to Table 4a.

Appendix Table 3a
Detailed decomposition by individual variables, Germany, 1998-2004

Reference group:	1998 coefficients	2004 coefficients	Pooled
(a) Collective agreement of any type/union recognition			
Mean coverage difference between 2004 and 1998 (%)	-11.4 (0.020)	-11.4 (0.020)	-11.4 (0.020)
Composition effects due to:			
Industrial sector	-0.024 (0.010)	-0.027 (0.007)	-0.025 (0.008)
Establishment size	0.004 (0.002)	0.004 (0.002)	0.004 (0.002)
Leading region	0.018 (0.003)	0.015 (0.003)	0.016 (0.003)
Foreign owned	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Single establishment	0.003 (0.002)	0.005 (0.002)	0.004 (0.002)
Establish. older than 10 years	0.007 (0.004)	0.006 (0.003)	0.007 (0.003)
Proportion female workers	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)
Proportion part-time workers	0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)
Proportion skilled workers	0.004 (0.003)	0.006 (0.003)	0.006 (0.003)
(Total, in percentage)	+1.2 (0.011)	+0.7 (0.009)	+1.0 (0.009)
Within effects due to:			
Industrial sector	-0.030 (0.038)	-0.026 (0.035)	-0.029 (0.036)
Establishment size	0.002 (0.015)	0.002 (0.015)	0.002 (0.015)
Leading region	-0.028 (0.030)	-0.025 (0.027)	-0.026 (0.028)
Foreign owned	0.001 (0.004)	0.001 (0.003)	0.001 (0.003)
Single establishment	-0.050 (0.033)	-0.052 (0.034)	-0.051 (0.033)
Establish. older than 10 years	-0.013 (0.039)	-0.012 (0.035)	-0.013 (0.037)
Proportion female workers	-0.009 (0.040)	-0.009 (0.039)	-0.009 (0.040)
Proportion part-time workers	0.033 (0.023)	0.035 (0.025)	0.034 (0.024)
Proportion skilled workers	0.023 (0.045)	0.021 (0.041)	0.022 (0.043)
Constant	-0.055 (0.092)	-0.055 (0.092)	-0.055 (0.092)
(Total, in percentage)	-12.6 (0.019)	-12.0 (0.019)	-12.4 (0.019)

Notes: In columns (1) and (2), we use 1998 and 2004 coefficients, respectively. In column (3), we use an weighted average of 1998 and 2004 coefficients. The 'detailed' explained (or compositional) effect Δ_x is given by $\Delta_x = \sum_{k=1}^{K} (x_{Bk} - x_{Ak}) b_{Ak}$, while the 'detailed' within (or unexplained) effect Δ_u is given by $\Delta_u = (b_{B0} - b_{B0}) + \sum_{k=1}^{K} x_{Bk} (b_{Bk} - b_{Ak})$, where b_{B0} and b_{B0} denote the constant in each group's model. *A* and *B* stand for countries (Germany and Britain) or time (1998 and 2004). Standard errors are given in parentheses.

Appendix Table 3b
Detailed decomposition by individual variables, Britain, 1998-2004

Reference group:	1998 coefficients	2004 coefficients	Pooled
(a) Collective agreement of any type/union recognition			
Mean coverage difference between 2004 and 1998 (%)	-5.8 (0.024)	-5.8 (0.024)	-5.8 (0.024)
Composition effects due to:			
Industrial sector	-0.014 (0.010)	-0.002 (0.008)	-0.010 (0.008)
Establishment size	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.002)
Leading region	0.003 (0.003)	0.002 (0.002)	0.002 (0.002)
Foreign owned	-0.005 (0.003)	-0.002 (0.002)	-0.004 (0.002)
Single establishment	0.004 (0.006)	0.003 (0.005)	0.004 (0.006)
Establish. older than 10 years	-0.001 (0.003)	0.004 (0.003)	0.001 (0.002)
Proportion female workers	-0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)
Proportion part-time workers	0.002 (0.003)	0.001 (0.001)	0.002 (0.002)
Proportion skilled workers	0.001 (0.001)	0.006 (0.004)	0.003 (0.003)
(Total, in percentage)	-1.3 (0.012)	+0.8 (0.010)	-0.3 (0.010)
Within effects due to:			
Industrial sector	0.071 (0.069	0.063 (0.066)	0.067 (0.068)
Establishment size	0.025 (0.023	0.024 (0.022)	0.025 (0.022)
Leading region	0.010 (0.010	0.012 (0.012)	0.011 (0.011)
Foreign owned	0.009 (0.006	0.006 (0.004)	0.008 (0.005)
Single establishment	0.013 (0.019	0.014 (0.020)	0.014 (0.019)
Establish. older than 10 years	0.062 (0.039	0.057 (0.036)	0.060 (0.037)
Proportion female workers	0.047 (0.052	0.047 (0.052)	0.047 (0.052)
Proportion part-time workers	-0.021 (0.033	-0.020 (0.031)	-0.020 (0.031)
Proportion skilled workers	-0.037 (0.038	-0.043 (0.045)	-0.040 (0.042)
Constant	-0.227 (0.133	-0.227 (0.133)	-0.227 (0.133)
(Total, in percentage)	-4.6 (0.022)	-6.6 (0.023)	-5.6 (0.022)

Note: See notes to Appendix Table 3a.

Appendix Table 4
Within-versus compositional change in Germany and Britain by type of agreement, weighted data, probit estimates, 1998 and 2004

		Germany		Britain	
		1998	2004	1998	2004
	(a) Collective agreement of any type/union recognition				
(1)	Observed coverage rate (%)	62.5	51.1	20.3	14.5
(2)	Percentage point change, 1998-2004		-11.4		-5.8
(3)	2004 (predicted) coverage based on 1998 coefficients		64.2 (0.005)		19.4 (0.006)
(4)	1998 (predicted) coverage based on 2004 coefficients	50.4 (0.007)		13.3 (0.006)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.7 (-15.3%)		-0.9 (16.0%)
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-13.1 (115.3%)		-4.9 (84.0%)
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.7 (-6.2%)		1.2 (-20.3%)
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-12.1 (106.2%)		-7.0 (120.3%)
	(b) Collective agreement of any type				
(1)	Observed coverage rate (%)	62.5	51.1	16.9	10.6
(2)	Percentage point change, 1998-2004		-11.4		-6.3
(3)	2004 (predicted) coverage based on 1998 coefficients		64.2 (0.005)		17.4 (0.005
(4)	1998 (predicted) coverage based on 2004 coefficients	50.4 (0.007)		10.2 (0.004)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.7 (-15.0%)		0.4 (-7.1%)
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-13.1 (115.0%)		-6.8 (107.1%)
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.7 -6.3%)		0.4 (-6.0%)
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-12.1 (106.3%)		-6.7 (106.0%)

	(c) *Sectoral-level agreement*				
(1)	Observed coverage rate (%)	56.9	47.1	4.2	1.8
(2)	Percentage point change, 1998-2004		-9.8		-2.4
(3)	2004 (predicted) coverage based on 1998 coefficients		58.4 (0.005)		3.7 (0.002)
(4)	1998 (predicted) coverage based on 2004 coefficients	46.6 (0.005)		1.8 (0.001)	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		1.5 (-14.9%)		-0.5 (21.8%)
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-11.3 (114.9%)		-1.9 (78.2%)
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.5 (-5.5%)		0.0 (1.3%)
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-10.3 (105.5%)		-2.4 (98.7%)
	(d) Firm-level agreement				
(1)	Observed coverage rate (%)	5.6	4.0	8.3	7.7
(2)	Percentage point change, 1998-2004		-1.6		-0.6
(3)	2004 (predicted) coverage based on 1998 coefficients		5.7 (0.001)		8.7 (0.003)
(4)	1998 (predicted) coverage based on 2004 coefficients	4.0 (0.001)		7.0 (0.003	
(5)	Percentage point change due to changes in characteristics based on 1998 coefficients		0.2 (-10.1%)		0.3 (-54.8%)
(6)	Percentage point change due to changes in behaviour based on 1998 coefficients		-1.7 (110.1%)		-1.0 (154.8%)
(7)	Percentage point change due to changes in characteristics based on 2004 coefficients		0.0 (-0.6%)		0.7 (-111.3%)
(8)	Percentage point change due to changes in behaviour based on 2004 coefficients		-1.6 (100.6%)		-1.3 (211.3%)

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